

September 10, 2018

City of Prattville, Alabama
101 West Main Street
Prattville, Alabama 36067

**RE: South Industrial Park Wastewater Improvements
EOS Project No. PV-1605**

ADDENDUM No. 1

The changes, modifications and / or additions covered by and set forth in this Addendum No. 1 shall become part of and be incorporated into the Specifications, Contract Documents, and Bid Documents for the above referenced project.

GENERAL

1. Please note that the Bid Date has been postponed to Wednesday, September 19, 2018, at 2:00 pm in the Human Resources Conference Room in City Hall at 101 West Main Street, Prattville, AL 36067.
2. The Owner has coordinated with the Alabama Power Co after the Pre-Bid Meeting to confirm power availability and project scheduling. Per this meeting, 480V, 3-phase power can be available to the site within 6 weeks from notice from the Contractor. Any cost for extending power to the site shall be by the Owner. All costs associated with the meter are the Contractor's responsibility (per project specifications).
3. Per a question asked at the Pre-Bid Meeting, attention is called to the following:

"Each bid must be submitted on the prescribed form and accompanied by Certification of Bidder Regarding Equal Employment Opportunity, Form 950.1 (page 13); and Certification of Bidder Regarding Section 3 and Segregated Facilities (page 14). All blank spaces for bid prices must be filled in, in ink or typewritten, in both words and figures, and the foregoing Certifications must be fully completed and executed when submitted.

Each bid must be submitted in a sealed envelope bearing on the outside the name of the bidder, his/her address, AL General Contractor's License Number and the name of the project for which the bid is submitted. If forwarded my mail, the sealed envelope containing the bid must be enclosed in another envelope addressed as specified in the bid form."

SPECIFICATIONS

Insert and replace the following Specification Sections:
SECTION 00 43 24 – BASIS OF PAYMENT

Insert the following Specification Sections:
SECTION 41 22 13 – HOIST SYSTEMS

SECTION 40 23 60 – PROCESS VALVES

1. Insert the following:

“2.08 COMBINATION AIR AND VACUUM RELEASE VALVES

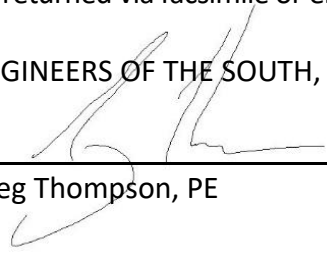
A. The combination air and vacuum release valve shall be specifically designed for wastewater applications and shall be 316 stainless steel.

B. Approved manufacturers are

- 1) ARI model D-023 (stainless steel)
- 2) International Valve / Vent-Tech model SXG – Series C”

This Addendum No. 1 shall be attached to the front of your set of Specifications and made a part of the Specifications and Contract Documents. Acknowledgement of Receipt of Addendum No. 1 shall be returned via facsimile or email to our office.

ENGINEERS OF THE SOUTH, LLC



Greg Thompson, PE

SECTION 00 43 24 - BASIS OF PAYMENT

CITY OF PRATTVILLE, AL SOUTH INDUSTRIAL PARK LIFT STATION

The following sections summarize the intent of the bid documents for providing a basis of payment for all work required to complete the project. Descriptions correspond to the numbering in the Unit Prices Form. Any misinterpretations of these descriptions evident in the Contractor's proposal as an "unbalanced" bid shall be basis for considering the bid unresponsive. As described in the Instructions to Bidders Section, the Owner reserves the right to reduce quantities and/or completely remove bid items from the work. The estimates of work listed in the Unit Prices Form are to be considered only approximate quantities of items and are to be used as a basis for comparing bids. The Owner does not guarantee that the approximate quantities or allowances given will hold in the construction of the work. Final Payment will be made for actual quantities of the work performed as approved by the Engineers, at the contract prices bid. Should the quantities of the pay items be more or less than the quantities estimated, the contract unit prices bid in the Proposal will prevail.

BASE BID ITEMS

Item 1 - Mobilization, Bonds, & Insurance

The Contract Lump Sum Price shall be the cost allowed by the Owner for mobilization of Contractor's forces, bonding the Project, and providing the specified Project insurance. The cost includes portions or the entire Contractor's cost for setting up of Contractor's forces, acceptance by Engineer and Owner of schedule of payment values, and equipment and personnel movement. The price established by the Owner is an allowance for the Contractor and will be paid upon completion of mobilization. Any costs the Contractor may have above the allowances to complete these Items shall be evenly distributed and included in the remaining Bid Items. Payment for this item shall not exceed the original contract amount bid regardless of the fact that the Contractor may have, for any reason, shut down his work on the project, moved equipment away from the project and then back again, or for additional quantities or items of work added to the contract.

Item 2 – Clearing and Grubbing

The Contract Lump Sum Price shall be payment in full for the furnishing of all labor, materials, and equipment necessary to complete the clearing, grubbing, and dewatering if required in preparation for sewer installation.

Item 3 – Temporary Erosion Control

The Contract Lump Sum Price shall be payment in full for the furnishing of all labor, materials, and equipment necessary to provide and maintain erosion control throughout the duration of the project. Contractor shall be responsible for the design and maintenance of all erosion and sediment control systems. Bid prices shall include, but not be limited to: ADEM Stormwater Permit, silt fence, hay bales, temporary seeding, temporary mulching, temporary pipe, temporary wire fence (including posts), polyethylene, sand bags, erosion control check dams, temporary riprap, and drainage sump excavation.

The lump sum price coverage for items listed shall be full compensation for furnishing all materials, the construction and/or installation of the materials into complete erosion control measures, and shall include all equipment, tools, labor, and incidentals necessary to complete the work, to maintain all work in an acceptable condition as long as deemed necessary by the Engineer, and to remove all items as directed.

Item 4 – South Industrial Park Lift Station

The Contract Lump Sum Price shall be the furnishing of all labor, materials, and equipment necessary to complete the South Industrial Park Lift Station (including Prop MH: 40) excluding the work and materials listed in all other items. This includes, but is by no means limited to, excavation, crushed stone foundation, precast concrete wetwell, valve vault, Prop MH: 40, backfill, compaction, piping, submersible pumps, valves, gravel paving, fencing, gates, monorail hoist system, flow meter, water service (including all Prattville Water Works fees and charges), landscaping, electrical, pump control panel, aluminum canopy, standby generator, wetwell lining system, Protecto401 lined ductile iron forcemain to the extent shown on the Plans, etc. This shall include all items not listed as separate Bid Items in complete accordance with the Plans, Specifications, and Contract documents.

Item 5 – Abandon Existing Sanitary Sewer Manhole

The Contract Unit Price shall be payment in full for the furnishing of all labor, materials, and equipment for the complete abandonment or demolition of one existing sanitary sewer manhole in accordance with the Plans and Specifications.

Item 6 – 60” Doghouse Manhole – Prop MH: 50

The Contract Unit Bid Price per each shall be payment in full for the furnishing of all labor, materials, and equipment necessary to completely construct the Prop MH: 50 (manhole) on the alignment and grade as shown in the Plans. Bid price shall include but not be limited to: all manhole sections; manhole steps, flexible pipe connectors; bolt down watertight rings and covers; all excavation; backfilling; protection and/or replacement of all existing utilities and structures; compaction of all backfill materials; replacement of any damaged property; traffic control; and all incidentals necessary and required to complete the work satisfactory to the Owner and Engineer.

Items 7 through 11 – 48” Manholes (Various Depths of Cut)

The Contract Unit Bid Price per each shall be payment in full for the furnishing of all labor, materials, and equipment necessary to completely construct the manholes on the alignment and grades shown in the Plans. Bid prices shall include but not be limited to: all manhole sections; manhole steps, flexible pipe connectors; non-watertight rings and covers; all excavation; backfilling; protection and/or replacement of all existing utilities and structures; compaction of all backfill materials; replacement of any damaged property; traffic control; and all incidentals necessary and required to complete the work satisfactory to the Owner and Engineer. Depths of cut shall be measured from existing grade to the pipe invert.

Items 12 through 15 – 15” PVC Gravity Sewer (Various Depths of Cut)

The Contract Unit Price per linear foot shall be payment in full for the furnishing of all labor, materials, and equipment necessary to completely construct the 15” sewers to the alignment and grades shown in the Plans. Bid prices shall include but not be limited to: all sewer line installations; excavation; bedding (crushed river rock); haunching (crushed river rock); backfilling (crushed stone beneath roadways shall be paid in separate bid item); temporary connections or manholes for by-pass pumping; temporary connections to existing sewers; temporary or permanent plugs for lines; protection and/or replacement of all existing utilities and structures; compaction of trenches; dewatering; water management; replacement of any damaged property; driveway replacement; setting of alignment and grade; and all incidentals necessary and required to complete the work satisfactory to the Owner and Engineer. Depths of cut shall be measured from existing grade to the pipe invert.

Items 16 through 20 – 14” Ductile Iron Gravity Sewer (Various Depths of Cut)

The Contract Unit Price per linear foot shall be payment in full for the furnishing of all labor, materials, and equipment necessary to completely construct the 14” sewers to the alignment and grades shown in the Plans. Bid prices shall include but not be limited to: all sewer line installations; excavation; bedding (crushed river rock); backfilling (stone beneath roadways shall be paid in separate bid item); demolition of existing lines and manholes; temporary connections or manholes for by-pass pumping; temporary connections to existing sewers; temporary or permanent plugs for lines; protection and/or replacement of all existing utilities and structures; compaction of trenches; dewatering; water management; replacement of any damaged property; driveway replacement; traffic control; setting of alignment and grade; and all incidentals necessary and required to complete the work satisfactory to the Owner and Engineer. Depths of cut shall be measured from existing grade to the pipe invert.

Items 21 and 22 – DI MJ x MJ Ex-Tend with MJ Adapters Fused to HDPE Pipe (Various Sizes)

The Contract Unit Price per each shall be payment in full for the furnishing of all labor and materials to install the DI MJ x MJ Ex-Tend (with sizes as shown) as shown on the Drawings. This includes all piping, polyethylene wrap, MJ Adapters fused to pipe and stone shown in the Plans and all other incidentals necessary and required for a complete air release valve installation.

Item 23 – Air Release Valve Assembly with High Density Polyethylene Tee

The Contract Unit Price per each shall be payment in full for the furnishing of all labor and materials to install the air release valves as shown on the Drawings. This includes all tees, piping, valves, air release valves, manholes, manhole covers, and stone shown in the Plans and all other incidentals necessary and required for a complete air release valve installation.

Item 24 – 10” DR17 High Density Polyethylene Force Main

The Contract Unit Price per linear foot shall be payment in full for the furnishing of all labor, materials, and equipment necessary to completely construct the new force main to the alignment shown in the Plans or as adjusted in the field with the Engineer’s approval. Bid prices shall include but not be limited to: pipe; trace wire; open cut excavation; dewatering; bedding; backfilling; protection and/or replacement of all existing utilities or structures; compaction of trenches; replacement of any damaged property; flushing; and all incidentals necessary and required to complete the work satisfactory to the

Owner and Engineer. HDPE bedding and initial backfill shall consist of 6" of compacted crushed stone bed and the trench shall be filled to 6" over the top of pipe with compacted crushed stone.

Item 25 – 10" DR17 High Density Polyethylene Force Main (Horizontal Directional Drilling)

The Contract Unit Price Bid per linear foot shall be compensation in full for the furnishing of all labor, materials and equipment, pipe fittings, adapters, 10" DR17 HDPE pipe as indicated on the Plans, and any and all incidentals necessary to complete the HDD satisfactorily and acceptable to the Engineer and the Owner. The price shall include, but not be limited to, anchoring pipe, tracing wire, piping, shoring, dewatering, etc. The Contractor may install additional sections of the force main by HDD at his discretion at no additional cost to the Owner. The Owner reserves the right to increase the quantity of HDD at his sole discretion.

Item 26 – 10" DR17 High Density Polyethylene Fittings

The Contract Unit Price per each shall be payment in full for the furnishing of all labor, materials, equipment, and incidentals to fuse and install HDPE fittings on the force main where indicated in the Plans or required in the field. Unauthorized fittings will not be paid for.

Item 27 – Concrete Anchor for Force Main

The Contract Unit Price per each shall be payment in full for the furnishing of all labor and materials to install the concrete anchor as shown on the Drawings. This includes all concrete, reinforcing, pipe, MJ restraint, pipe restraints and rodding in the Plans and all other incidentals necessary and required for a complete concrete anchor installation.

Item 28 – Wetlands Jack and Bore Casing Installation with 24" Casing

The Contract Lump Sum Price shall be payment in full for furnishing and installing encasement pipe including, but not limited to all material, labor, equipment and incidentals (including but not limited to stainless steel spacers, end seals, locate wire, etc.) necessary to install and complete the encasement pipe of various sizes and types in accordance with the Plans and Specifications. No monies will be paid (i.e. no partial payments) for unsuccessful bores or for bores that are not usable. The carrier pipe inside encasement pipe will not be included in the unit price bid for encasement pipe. All carrier pipe inside encasement shall be paid at 0-8' depths, regardless of actual depth of encasement.

Item 29 – Installing Forcemain Through Existing Industrial Parkway Encasements

The Contract Unit Price shall be payment in full for furnishing and installing all accessories necessary to install the carrier pipe inside an existing encasement pipe, including, but not limited to all material, labor, equipment and incidentals (including but not limited to stainless steel spacers, end seals, locate wire, etc.) necessary in accordance with the Plans and Specifications. The carrier pipe inside encasement pipe will not be included in this unit price bid.

Items 30 and 31 – Autauga County Road 4 Jack and Bore Casing Installation with 20” Casing

The Contract Lump Sum Price shall be payment in full for furnishing and installing encasement pipe including, but not limited to all material, labor, equipment and incidentals (including but not limited to stainless steel spacers, end seals, locate wire, etc.) necessary to install and complete the encasement pipe of various sizes and types in accordance with the Plans and Specifications. No monies will be paid (i.e. no partial payments) for unsuccessful bores or for bores that are not usable. The carrier pipe inside encasement pipe will not be included in the unit price bid for encasement pipe. All carrier pipe inside encasement shall be paid at 0-8’ depths, regardless of actual depth of encasement.

Item 32 – Concrete Pipe Encasement

The Contract Unit Bid Price per each shall be payment in full for the furnishing of all labor, materials, and equipment necessary to completely encase the proposed pipe in concrete encasement in accordance with the Plans and Specifications and where shown in the Plans. Bid prices shall include all incidentals necessary and required to complete the work satisfactory to the Owner and Engineer. Measurement shall be made in pipe alignment and shall be regardless of trench width.

Item 33 – Rip-Rap and Geotextile Fabric

The Contract Unit Price bid shall be compensation in full for furnishing and installing, one (1) square yard of rip-rap and geotextile fabric, complete in place, to the thickness and lines shown on the Plans or as directed by the Engineer.

Item 34 – Crushed Stone Backfill

The Contract Unit Price per ton shall be payment in full for the furnishing of all labor, materials, and equipment necessary to install the crushed stone backfill for all sewer lines installed through paved areas. The per ton unit price shall apply to all types of stone per the trench backfill detail in the plans.

Item 35 – Concrete Removal and Replacement

The Contract Unit Price bid for this item shall be compensation in full for furnishing all equipment, labor, materials, transportation, handling, delivery and all incidentals necessary for removing and replacing 1 square yard of concrete (paving or curb and gutter), under which pipe is laid. Curb, gutter, and curb and gutter replaced shall be of the same type and thickness as that removed, with concrete, 3,000 psi minimum strength.

In measuring this item for payment, the outside limits of measure shall be the inside diameter of the pipe plus 30 inches, regardless of the amount removed and replaced. Where pipe is installed by boring or tunneling under curb and gutter, payment will be made under this item in lieu of payment for boring or tunneling.

Item 36 – Asphalt Removal and Replacement

The Contract Unit Price bid shall be compensation in full for furnishing all labor, material, equipment and incidentals for removing and replacing 1 ton of Asphalt Pavement (as detailed on the Plans) including, but not limited to, removal of existing pavement, base course, prime coat, surfacing and striping or marking.

In measuring this item for payment, the length removed (following the alignment of the installed pipe line) multiplied by a width of the inside pipe diameter plus 36 inches and then converted to tonnage, will be the amount paid for, regardless of the width removed and replaced. No additional allowance will be made for bell holes or manholes or structures.

Item 37 – Traffic Control

The Contract Lump Sum Price shall be payment in full for the furnishing of all labor, equipment, and material for developing, implementing, and maintaining traffic control throughout the project. The Contractor shall provide traffic control as required for safety and maintained access to all homes and businesses.

Item 38 – Allowance for Owner / Engineer Selected Items

The Contract Lump Sum Allowance shall be for the furnishing of Owner specified services, equipment, or materials. The Owner will pay the Contractor and the Contractor shall issue a purchase order to the specified vendor or supplier. Payment procedures shall be the same as for all other equipment and materials supplied by the Contractor. The price written in for this item represents an allowance that is used by all Contractors bidding the project.

Item 39 – Testing, Start-Up, & Restoration of Project Areas

The Contract Lump Sum Price shall be the cost allowed by the Owner for furnishing completed and operable lift station which has successfully passed all tests and been approved by all authorities for use by the Owner. The price in this Item represents an allowance that is established by the Owner and used by all Contractors bidding the project. The amount of money written in this Item will be paid the Contractor when the entire project is complete and all landscaping, site work, drainage work, repairs and final cleanup of project site have been accomplished. Since all components of the proposed improvements and cleanup are an integral part of the entire project needed by the Owner, partial payment will not be allowed on this Item.

Alternate Bid Items

Note

The Contract Unit (or Lump Sum) prices for these items may be additive or deductive to the item referenced in the Item Number. The Contractor shall use parentheses to document deductive prices.

Example of a deductive bid:

| | | | | | |
|----|--|---|----|--------------|--------------|
| 4b | 6" DI Protecto 401 Lined Force Main in Wetwell | 1 | LS | (\$6,750.00) | (\$6,750.00) |
|----|--|---|----|--------------|--------------|

Item 4a – Alternate Pump Manufacturer (KSB)

The Contract Lump Sum Price shall be the additive or deductive price for an alternate submersible pump manufacturer (KSB) in lieu of Flygt.

Item 4b – 6” D.I. Protecto401 Lined Force Main Inside Wetwell

The Contract Lump Sum Price shall be the additive or deductive price for Protecto401 lined ductile iron pipe and fittings inside the South Industrial Park Lift Station wetwell in lieu of stainless steel.

Item 4c – Third Pump Inside Wetwell

The Contract Lump Sum Price shall be the additive price for providing and installing a third pump inside the South Industrial Park Lift Station wetwell. It shall include furnishing of all labor, materials, and equipment for the complete installation of Submersible Pump Number 3. This item shall include, but not be limited to: submersible pump number 3, VFD feeder breaker, VFD, control station, and all wiring/cabbling associated with Pump No. 3, and any other miscellaneous materials shown or required for a complete and operable Pump Number 3 in full compliance with the Plans, Specifications, and Contract Documents.

Items 24a through 24e – 10” Force Main Piping (Various Materials and Linings)

The Contract Unit Price per linear foot shall be the additive or deductive price for the various materials and lining systems specified. Note that all costs for bedding and initial backfill (haunching) shall be included. DI bedding shall be 6” of compacted crushed stone with compacted earthen backfill. PVC bedding and initial backfill shall consist of 6” of compacted crushed stone bed and the trench shall be filled to 6” over the top of pipe with compacted crushed stone.

Items 26a through 26b – Ductile Iron Fittings (Various Linings)

The Contract Unit Price per linear foot shall be the additive or deductive price for the various Ductile Iron Fittings with the lining systems specified.

Item 39 – Manhole Lining

The Contract Unit Price per vertical foot shall be compensation in full for lining the manholes installed within this project scope and the five existing manholes between the forcemain discharge manhole and the new Reuben Road manholes. It shall include, but is not limited to, all mobilization, setup, material, inspection, installation, access, testing, submittals, warranty documents, etc.

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SECTION 41 22 13 – HOIST SYSTEMS

PART 1 - GENERAL

1.01 SCOPE

- A. The Section covers all monorail and bridge crane hoist applications.
- B. Each hoisting system shall consist of all monorail section(s); all supports including support columns, beams and braces; electric motor driven trolley(s); electric wire rope hoist(s); manual push trolley(s), chain operated manual hoist(s); all track electrification appurtenances, clamps, stops; splices; welds; attachment hardware; anchorage; and all other accessories and appurtenances required for a fully functioning, complete hoisting system suitable for outdoor operations, and configured as shown on the Plans. The hoist system shall be designed by and provided by a single manufacturer / supplier with a minimum of ten (10) years of specialized experience in designing and manufacturing hoisting systems suitable for the intended application.

1.02 MANUFACTURERS

- A. The hoisting system shall be as designed and manufactured by
 - 1. ACCO Material Handling Systems
 - 2. Royce Crane Company
 - 3. DeShazo Crane Company
 - 4. Konecranes
 - 5. Gorbel, Inc.
 - 6. Or approved equal

1.03 RESPONSIBILITIES

- A. Crane vendor will furnish on this order:
 - 1. All material necessary for complete installation of the above-mentioned crane
 - 2. Complete controls
 - 3. Equipment operating instructions
 - 4. Drawings and parts lists as specified
 - 5. All required epoxy anchor bolts and installation recommendations for column base plates
- B. Building contractor will furnish the materials and labor for the following:
 - 1. Foundation – this is an existing structure / building

1.04 OPERATING CONDITIONS

- A. The equipment will be installed in or on existing structures / buildings
- B. The atmospheric conditions are classified as moist environment
- C. Electrical classification: C
- D. Electrical power characteristics: Power for operating the equipment will be supplied by a 460 Volt 3 Phase, 60 hertz circuit

1.05 SUBMITTALS

- A. Reference Section 01 33 00 – Submittals
- B. Submit the following items:
 - 1. Manufacturer/Supplier shall provide a complete submittal for the complete monorail / hoisting system stamped by a professional engineer registered in the State of Alabama. Submittal shall include all component data sheets; arrangement Drawings showing plan, elevation and sectional views; support columns and beams; welding and splice locations; end stop locations; factory painting systems; proposed anchorage, electrification components, along with all other pertinent data. In addition, the submittal shall include the worst-case load reactions (i.e. at rated capacity loading) at each point where the monorail system is anchored to the building structure.
 - 2. Product Data with final design loadings
 - 3. Shop Drawings: Include special conditions not detailed in Product Data.
 - 4. Closeout Submittals:
 - a. Operation and Maintenance Manual.
 - b. Certificate stating that installed materials comply with this specification.

1.06 DELIVERY, STORAGE AND HANDLING

- A. Delivery and Storage: Inspect materials delivered to site for damage; unload and store with minimum handling. Materials shall be stored on-site in enclosures or under protective coverings. Protect materials not suitable for outdoor storage to prevent damage during periods of inclement weather, including subfreezing temperatures, precipitation and high winds. Store materials susceptible to deterioration by direct sunlight under cover and avoid damage due to high temperatures. Do not store materials directly on ground. When special precautions on outside of equipment or its crating.
- B. Handling: Handle materials in such a manner as to ensure delivery to final location in undamaged condition. Make repairs to damaged materials at no cost to Owner.

1.07 QUALITY ASSURANCE

- A. Certificates: Overload Test Certificate: Submit a statement that the hoist system can be periodically load tested to 125 percent of rated load.
- B. Manufacturer's Certificate of Compliance, in accordance with Division 1, GENERAL REQUIREMENTS.
- C. Test Procedures.
- D. Test results, reports, and certifications
- E. Special shipping, storage, protection, and handling instructions.
- F. Manufacturer's Certificate of Proper Installation
- G. Contract Closeout Submittals: Service records for maintenance performed during construction.

1.08 OPERATION AND MAINTENANCE DATA

- A. O&M Manuals: Content, form, and schedule for providing as specified in Section 01 78 23, OPERATION AND MAINTENANCE DATA.
- B. Maintenance Summary Forms: As specified in Section 01 78 23, OPERATION AND MAINTENANCE DATA.

1.09 WARRANTY

- A. Provide warranty for a period of 12 months after the final acceptance of the equipment by the Owner and Engineer. The warranty shall stipulate that the equipment furnished is suitable for the purpose intended and free from defects of material and workmanship for the duration of the warranty. In the event the equipment fails to perform as specified, the Manufacturer shall promptly repair or replace the defective equipment without additional cost to the Owner.
- B. Spare parts identified within this specification shall not be used to address warranty repairs.

PART 2 - PRODUCTS

2.01 GENERAL DESIGN CRITERIA

- A. Codes and Definitions
 - 1. Definitions of terms used in this specification shall be as used in the Glossary of ANSI MH27.1 as prepared by the Monorail Manufacturers Association (MMA). The latest editions of the following specifications and codes shall be conformed to the extent applicable for the application under consideration:
 - a. For all equipment: NFPA-70 National Electric Code (N.E.C.)
 - b. For Underhung Bridge Cranes and Monorail Systems: E21-195ANSI B30.11 Safety Standard for Monorails and Underhung Cranes ANSI MH27.1 Specifications for Underhung Cranes and Monorail Systems
 - c. For Hoists: ANSI B30.16 Safety Standard for Overhead Hoists, HMI Standard - Underhung; ANSI/ASME HST-1M Performance Standards for Electric Chain Hoists; ANSI/ASME HST-2M Performance Standards for Hand Chain Manually Operated Chain Hoists; ANSI/ASME HST-4M Performance Standards for Overhead Electric Wire Rope Hoists
 - d. Specifications for Design, Fabrication and Erection of Steel Buildings of the American Institute of Steel Construction (AISC)
 - e. LRFD Manual of Steel Construction (Current Edition)
 - f. ASD Manual of Steel Construction (Current Edition)
 - g. American Welding Society (AWS) D14.1 Specifications for Welding Industrial and Mill Cranes and D 1.1 Code for Structural Welding.
 - h. Occupational Safety & Health Act (OSHA)
- B. Materials
 - 1. All materials shall be new, and the completed Overhead Handling System shall be essentially the product of one crane manufacturer regularly engaged in the production of such equipment. All materials shall be suitable and recommended for outdoor operation.
- C. Service Class
 - 1. All equipment shall be designed for outdoor service and a minimum "Class C" - Moderate Service, as specified in the ANSI MH27.1 Specifications as prepared by the

Monorail Manufacturers Association (MMA). The hoisting system shall be suitable for normal ambient temperatures (0° to 40° C).

- a. NOTE: The monorail system at the Raw Sewage Pump Station will be installed under a canopy (i.e. no sides, only a roof).
 - b. NOTE: The existing monorail in the Maintenance Building is inside the building or under the canopy. The remainder of the monorail system extends out from under the canopy and is completely exposed to the weather elements.
2. A section of the Raw Sewage Pump Station monorail systems will be an unsupported cantilever. See Contract Drawings.

D. Vertical Impact

1. An impact allowance shall be included in design calculations for carriers (trolleys), cranes and runway monorail tracks. The minimum impact allowance shall be 1/2% of the rated load for each “foot per minute” of the hoisting speed with a minimum allowance of 15% and a maximum of 50%. For bucket and magnet applications, the minimum impact allowance shall be a minimum of 50% of the rated load.

2.02 SPECIFIC DESIGN CRITERIA

A. Raw Sewage Pump Station Monorail #1

1. Type: Monorail
2. Trolley: Two speed (10 / 30 fpm) motorized with electric wire rope hoist
3. Rating: 2 tons

B. Raw Sewage Pump Station Monorail #2

1. Type: Monorail
2. Trolley: Two speed (10 / 30 fpm) motorized with electric wire rope hoist
3. Rating: 2 tons

C. Maintenance Building existing monorail

1. NOTE: Existing beams and support structure to be painted, serviced and reused.
2. Type: Monorail
3. Trolley: Two speed (10 / 30 fpm) motorized with electric wire rope hoist
4. Rating: Match existing

D. Main Electrical Building

1. NOTE: Existing beams and support structure to be painted, serviced and reused.
2. Type: Monorail
3. Trolley: Two speed (10 / 30 fpm) motorized with electric wire rope hoist
4. Rating: Match existing

E. Miscellaneous

1. Provide one (1) manual push trolley with manual chain operated hoist rated for 2 tons.

2.03 CRANE RUNWAYS

- A. Crane runway support steel, runway rails and crane runway stops shall be provided by the crane manufacturer. The runway will be designed with sufficient strength and rigidity to prevent undue lateral or vertical deflection for the wheel loading of the crane. The runway rails will be installed straight, parallel, and level, at the same elevation and center-to-center. The rails will be standard ASCE sections as specified by vendor.

2.04 BRIDGE

- A. The bridge shall consist of a single girder fabricated of structural steel sections. Sections shall be braced for rigidity and securely fastened to the end trucks to maintain proper alignment.
- B. The end trucks shall consist of structural sections bolted to the bridge beam. A long wheel base shall be provided for proper weight distribution. Each end truck shall be supplied with large diameter, heat treated, double-flanged, steel wheels.
- C. End truck wheels shall be of the fixed axle type equipped with anti-friction bearings. Substantial guards shall be provided in front of each wheel. These shall project below the top of the runway rail. Safety lugs shall be furnished on each end truck to prevent excess drop in case of axle failure.
- D. The bridge shall be motor-driven through suitable gear reducers. Gearing shall be enclosed and operate in an oil bath. An electro-mechanical brake shall be supplied on the motor drive.
- E. Rubber bumpers shall be furnished on the bridge end trucks.

2.05 TROLLEY

- A. A two speed (10 / 30 fpm) monorail type trolley shall be furnished to support the equipment and operate on the bridge girder. The motorized trolley shall have an electric wire rope hoist as part of its assembly.
- B. Trolley assemblies shall be articulating type if required, such that, the articulated connection shall permit rotational movement in all three axes. Load bars shall be cradled in the yokes in such a manner to assure that all wheels are in contact with the operating flange at all times. Trolley assemblies shall be as recommended by the track system manufacturer for proper/safe operation on straight and curved track sections (if required, radius shown on Contract Drawings) and for outdoor use.
- C. Design shall be such to facilitate easy installation or removal of wheels at any point along the track system without removing the carrier assembly from the track.
- D. Hardened tread wheels with anti-friction bearing shall be provided. Trolley wheels shall be made from high strength forged or machined steel, 5" minimum tread diameter. The wheel tread shall be accurately machined to assure concentricity of axle and tread, and hardened to 425 Brinell. Wheels are to be furnished with electro-plate finish, flack oxide, or equal treatment, in lieu of paint. Wheels shall be suitable for outdoor use.
- E. The trolley shall be motor-driven through a suitable gear reducer. An electric brake shall be furnished on this drive. The drive shall be shock free on starting and stopping. Motors for motor driven trolleys shall be 2 speed, suitable for outdoor, harsh environment with stainless steel nameplate, have suitable motor enclosure (TENV), internal rust inhibitor, and special shaft seals. Motors shall include space heaters to prevent condensation formation on the motor windings and have thermal overload protection.
- F. The trolley frame shall be welded or cast steel construction. It shall be of rigid construction designed to transmit the imposed load to the bridge girder without undue deflection.

- G. Safety lugs shall be furnished on each trolley.

2.06 HOIST

- A. A hoisting machine of proper capacity shall be mounted on the trolley. It shall consist of a motor, gear reducer, hoist drum, sheaves, load block, hook, and hoisting rope. An electric brake shall be supplied on the hoist.
- B. The motor shall be designed specifically for hoisting duty. The electric brake shall be of suitable size to promptly stop the motor rotation in either direction, and hold the load.
- C. Precision cut, full depth teeth, heat treated forged steel gears shall be used in the gear reducer. These gears shall be provided with oil bath lubrication and enclosed in a drip proof case.
- D. The hoist drum and sheaves shall be of large diameter to permit maximum rope life. The drum diameter shall be at least 20 times the rope diameter and shall be grooved to provide for the entire lift without overlapping the rope. The drum flanges shall be guarded so that the rope cannot wedge between the drum and the hoist frame.
- E. A paddle or weight-operated type upper limit switch shall be provided to protect against hoisting beyond safe limits or travel. This switch shall be connected to open a main line contactor. The switch system must be designed in such a manner that the switch operator mechanism cannot be over traveled and allow the switch to become inoperative.
- F. A loading limit control device shall be provided to prevent over stressing the system. This device shall de-energize the hoist motor and immobilize the up-circuit when an over capacity lift is attempted. This switch must be set to overcome dynamic loading conditions but not exceed 125% rated capacity.
- G. Geared upper and lower limit switches shall be furnished to restrict motion beyond the normal operating travel. These switch contacts shall be connected in the respective motor control circuits.
- H. The hoisting rope shall be steel, of suitable diameter, with a factor safety of at least five. Connection to the drum shall be made adequately and shall be easily detachable for replacement.
- I. The load block shall be of the enclosed type and equipped with a swivel type safety latch hook.

2.07 MOTORS

- A. All motors shall be totally enclosed, non-ventilated induction type. They shall be 460 volts, 3 phase.

2.08 CONTROL STATION

- A. A pendant type button push-button station shall be provided to control the motions of the bridge, trolley, and hoist.

- B. Electric pendant shall have a polycarbonate or lightweight polypropylene, NEMA 4X enclosure, have strain relief protection, and have the following buttons with markings.
 - 1. On
 - 2. Off, red color, wire to the hoist mainline contactor to disconnect all power to hoist motor and tractor motor.
 - 3. Up, 2 speeds (7 and 22 fpm)
 - 4. Down, 2 speeds (7 and 22 fpm)
 - 5. Forward, 2 speeds (10 and 30 fpm)
 - 6. Reverse, 2 speeds (10 and 30 fpm)
- C. Pendants shall be rated for 120 VAC, 1 phase
- D. Pendant shall have a stainless steel support chain with a latch so that the pendant station can be latched to the support chain for shortening the pendant cable length, and support the pendant station 3 feet above the operating/top floor with a 2'-9" loop. The pendant cable lengths shall be field measured and installed accordingly.

2.09 TRAVEL LIMIT SWITCHES

- A. Limit switches shall be provided on the bridge and trolley and wired into the respective control circuits to stop the driving motors at the extremes of travel.

2.10 CURRENT CONDITIONS

- A. A four-bar, enclosed type conductor system, Insul-8 or approved equal, shall be provided along the full length of the runway. Three of these conductors will be used to supply electric power to the crane. The remaining conductor will be used for equipment grounding.
- B. A 4 conductor, flat, neoprene insulated, festooned flexible cable shall be provided along the bridge to supply electric power to the hoist and trolley. Three of these conductors will be used to supply electric power. The remaining conductor will be used for equipment grounding. The cable shall be connected to a terminating box at one end of the bridge.

2.11 CRANE CONTROL

- A. Speed control shall be provided for all travel and hoisting motions as outlined in these specifications.
- B. All single motions shall be controlled by across-the-line, reversing type motor starters.
- C. The control circuit voltage shall not exceed 120 volts. This voltage shall be supplied from a dry type transformer of proper capacity.
- D. Fuse or circuit breaker protection shall be furnished for each individual crane motor.
- E. Forward and reverse motor contactors must be interlocked mechanically and electrically to prevent motor damage if the operator pushes the direction buttons simultaneously.

2.12 ELECTRICAL WIRING

- A. All electrical equipment shall be mounted in NEMA type 12, or better, enclosures

- B. All wiring connections within the electrical control enclosures shall be made with 600 volt, 90 degrees Celsius machine tool wire. Wiring connections between control enclosures and other electrical devices shall be made with 600 volt type THWN conductors and run in rigid conduit. Flexible metal conduit may be used to devices requiring position adjustment or run less than three feet. All wiring connections to electrical equipment in control enclosures shall be terminated on terminal strips with lugs or spades and properly identified.
- C. Conduits shall be terminated at all enclosures and boxes in drilled holes or knockouts.
- D. A grounding system shall be furnished to effectively maintain the enclosures of all electrical equipment such as motors, brakes, starters, push button stations, boxes, etc. at zero potential.

2.13 EQUIPMENT DESIGN SAFETY

- A. All equipment furnished to vendor's standard design, which incorporates weldments, is to be welded in accordance with the appropriate codes and standard of the American Welding Society.
- B. All equipment non-standard design to fulfill special requirements shall, in addition, meet the following:
 - 1. All critical welds, the failure of which would cause potential accidents or injuries to personnel, are to be executed with special attention as outlined in this specification.
 - 2. An audit is to be made by the vendor to determine those welds to be in the critical category. Such welds are to be given special attention by the vendor to insure adequate quality control.

2.14 PAINTING

- A. All surfaces of the structural parts of the crane shall be finished in accordance with Section 09 90 00.
- B. All surfaces of electrical and mechanical parts shall be finished in accordance with the vendor's standard practice.

PART 3 - EXECUTION

3.01 ERECTION AND INSTALLATION

- A. Erect and install the hoist system, complete in accordance with the approved submittals and in condition to perform the operational and acceptance tests.

3.02 INSPECTION AND TESTS

- A. Inspection by the building contractor/general contractor and customer during fabrication shall be permitted by the vendor. These inspections shall be performed to determine the general adherence to these specifications and, in particular, to determine the quality of welding and painting provided.
- B. Final acceptance will be made after the entire installation has been completed and a satisfactory trial has been made. All tests required to prove the ability of the crane shall be made by the crane manufacturer.

- C. The Manufacturer shall provide the services of a factory trained, experienced, competent, and authorized service representative to inspect, check, and approve the equipment installation. The Representative shall provide a written report to the Owner certifying that the equipment has been: properly installed, welded and lubricated; is in accurate alignment; meets all applicable codes and standards; all tolerances are met; is free from any undue stresses imposed by connecting equipment or anchorage; has been operated and load tested at 125% of the rated capacity; and that it operated satisfactorily.

3.03 GUARANTEE

- A. Vendor shall guarantee material and workmanship of equipment installed under these specifications for a period of one year following start-up, testing, and acceptance by the Owner.

3.04 GENERAL

- A. Any other requirements not set forth in these specifications, but necessary for the safe and reliable operation of the equipment, shall be included.

END OF SECTION 41 22 13

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